D 37/984

Preprint from the 1984

BUREAU OF MINES MINERALS YEARBOOK

The Mineral Industry of Delaware

NEWARK PUBLIC LIBRARY

APR 4 1986

U. S. GOVT. PUBS.
DEPOSITORY 376

UNITED STATES DEPARTMENT OF THE INTERIOR

I 28.37/a 2:

READEX FICHE best copy available

UNITED STATES DEPARTMENT OF THE INTERIOR • Donald Paul Hodel, Secretary

BUREAU OF MINES • Robert C. Horton, Director

This publication is a chapter from the current Bureau of Mines Minerals Yearbook, comprising *Volume I, Metals and Minerals; Volume II, Area Reports: Domestic; Volume III, Area Reports: International.* The separate volumes of the Yearbook are sold by the Superintendent of Documents, Washington, D.C. 20402.

The Mineral Industry of Delaware

This chapter has been prepared under a Memorandum of Understanding between the Bureau of Mines, U.S. Department of the Interior, and the Delaware Geological Survey for collecting information on all nonfuel minerals.

By William A. Bonin[1]

In May 1984, greensand joined construction sand and gravel and magnesium compounds as the only mineral commodities produced in Delaware. The value of magnesium compounds, which are extracted from seawater, is excluded from the State's total to prevent disclosure of company proprietary data. Elemental sulfur was recovered as a nondiscretionary byproduct at a petroleum refinery, which also produced sulfuric acid and petroleum coke. Chrome ore, gypsum, ilmenite, magnesium oxide, and manganese ore were shipped into the State for processing into higher value-added products. Slag was processed at the State's only steel mill.

Table 1.—Nonfuel mineral production in Delaware[1]

Mineral	1983		1984	
	Quantity	Value (thousands)	Quantity	Value (thousands)
Greensand thousand short tons	--	--	1	$18
Sand and gravel (construction) do.	e1,400	e$3,200	1,003	2,795
Total[2]	XX	3,200	XX	2,813

eEstimated. XX Not applicable.
[1]Production as measured by mine shipments, sales, or marketable production (including consumption by producers).
[2]Partial total; excludes the value of magnesium compounds, which must be concealed to avoid disclosing company proprietary data.

Table 2.—Indicators of Delaware business activity

		1982	1983	1984
Employment and labor force, annual average:				
Population	thousands	600	606	613
Total civilian labor force	do.	298	296	308
Unemployment	do.	25	24	19
Employment (nonagricultural):				
Mining total[1]	do.	.1	.1	.1
Manufacturing total	do.	67.9	68.2	70.5
Primary metal industries	do.	1.9	1.7	1.8
Stone, clay, glass products[1]	do.	.8	.8	NA
Chemicals and allied products	do.	31.8	30.8	31.7
Petroleum and coal products[1]	do.	1.2	1.2	NA
Construction	do.	15.4	16.1	16.9
Transportation and public utilities	do.	11.7	11.9	12.1
Wholesale and retail trade	do.	56.5	58.3	62.6
Finance, insurance, real estate	do.	13.9	15.5	17.4
Services	do.	49.9	52.6	57.7
Government and government enterprises	do.	43.8	43.4	43.4
Total	do.	259.2	266.1	[2]280.6
Personal income:				
Total	millions	$7,084	$7,538	$8,383
Per capita		$11,810	$12,422	$13,685
Hours and earnings:				
Total average weekly hours, production workers		39.2	40.6	41.9
Total average hourly earnings, production workers		$8.64	$9.19	$9.30
Earnings by industry:				
Farm income	millions	$108	$138	$183
Nonfarm	do.	$5,435	$5,837	$6,335
Mining total	do.	$5	$5	$5
Manufacturing total	do.	$2,117	$2,263	$2,461
Primary metal industries	do.	W	W	W
Stone, clay, glass products	do.	$15	$18	$21
Chemicals and allied products	do.	$1,258	$1,295	$1,386
Petroleum and coal products	do.	$60	$65	$70
Construction	do.	$352	$366	$380
Transportation and public utilities	do.	$303	$328	$345
Wholesale and retail trade	do.	$713	$744	$814
Finance, insurance, real estate	do.	$257	$314	$368
Services	do.	$864	$952	$1,041
Government and government enterprises	do.	$812	$851	$903
Construction activity:				
Number of private and public residential units authorized		2,968	3,648	4,368
Value of nonresidential construction	millions	$140.7	$136.6	$227.6
Value of State road contract awards	do.	$68.8	$64.9	$60.0
Shipments of portland and masonry cement to and within the State	thousand short tons	161	154	175
Nonfuel mineral production value:				
Total crude mineral value	millions	$3.2	$3.2	$2.8
Value per capita		$5	$5	$5

NA Not available. W Withheld to avoid disclosing company proprietary data.
[1]Bureau of Economic Analysis, Regional Economic Measurement Division, U.S. Department of Commerce.
[2]Data do not add to total shown because of independent rounding.

Sources: U.S. Department of Commerce, U.S. Department of Labor, Highway and Heavy Construction Magazine, and U.S. Bureau of Mines.

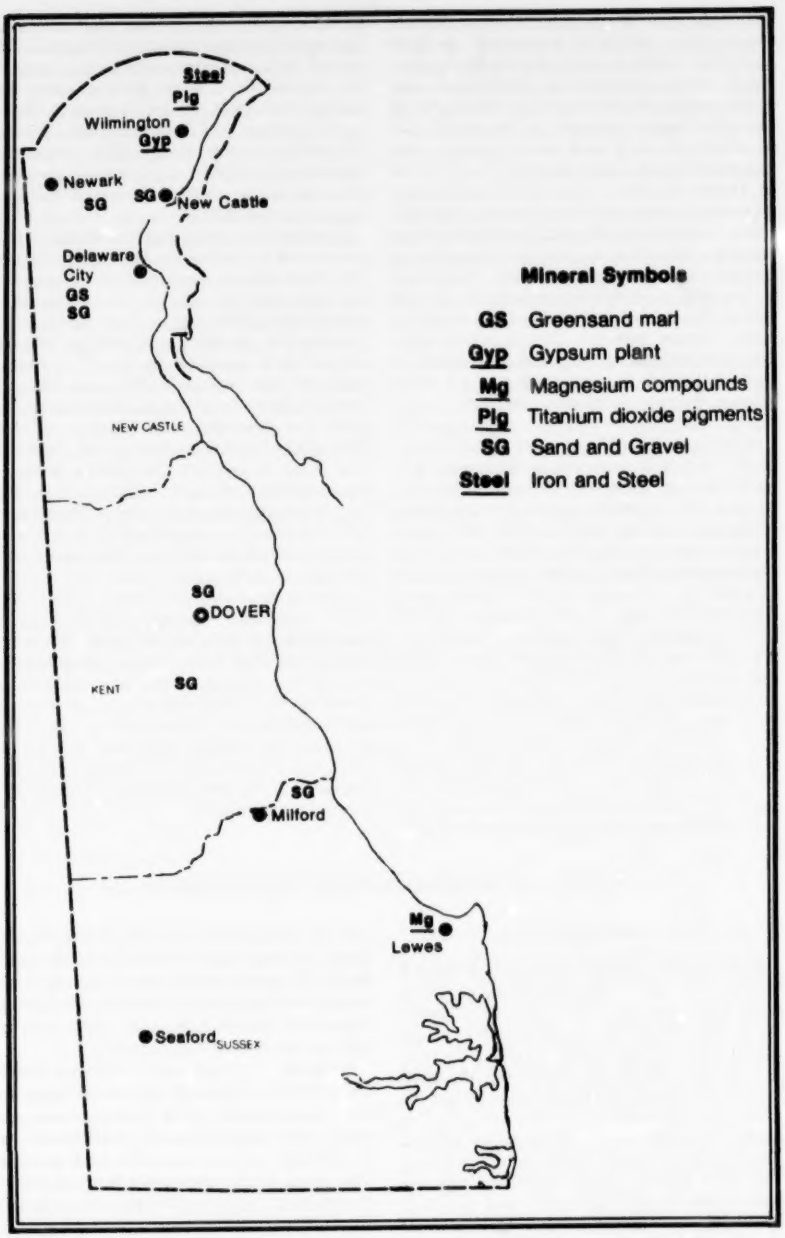

Figure 1.—Principal mineral producing localities in Delaware.

Trends and Developments.—The State's construction industry continued to rely heavily on shipments of construction aggregates from neighboring Maryland and southeastern Pennsylvania as evidenced by the significant decrease in production of construction sand and gravel despite the increased construction activity in 1984. Also, Delaware joined New Jersey as the only domestic producers of greensand. This material is an unconsolidated sediment of the coastal plain that is rich in glauconite, a hydrous iron-potassium silicate. It is used principally as a filter medium for the removal of iron and manganese from drinking water supply systems. Delaware's production was shipped to Pennsylvania, where it was processed for marketing as a slow release potash fertilizer and soil conditioner.

Nonfuel minerals and materials received at the Port of Wilmington in fiscal year (FY) 1984 (ending June 30) included alumina, chrome ore, dolomite, gypsum, manganese, magnesium oxides, perlite, salt, sulfur, aluminum, iron and steel, and lead. Imports of crude gypsum, the highest tonnage dry bulk commodity received in FY 1984, were 308,456 short tons, a 44% increase over FY 1983 shipments. Iron and steel imports in FY 1984 totaled 204,721 short tons, a 58% increase over that of FY 1983. The only dry bulk commodity to be exported during the year was petroleum coke at 205,782 short tons, down 34% from that of FY 1983.

In comparison with last year's figures, the port performed exceptionally well during FY 1984. Total revenues increased 8% to $9.2 million; total tonnage increased 29% to 2.8 million short tons; and container tonnage increased 45% to 257,000 tons. The overall value of commodities increased by an impressive 17% to $640 million. Also during FY 1984, nearly one-half of the port's acreage was designated as a Foreign Trade Zone. Such designation, when activated by importers, can provide economic advantages by way of financial relief on export-import duties.

Legislation and Government Programs.—The Delaware Geological Survey (DGS) continued programs in offshore oil and gas potential, geologic mapping, ground water availability and quality, cartographic information, landfills, and geologic hazards. Funds were provided by the U.S. Department of the Interior's Minerals Management Service in a cooperative agreement with the Association of American State Geologists for the studies by the DGS that will focus on geologic framework of oil and gas potential offshore Delaware Bay. Economic geology projects of the DGS during 1984 included investigations on uses of glauconite and advisement on State and county "mining laws."

New or expanded programs of the DGS in 1984 included initiation of a geologic atlas series to provide all available earth sciences-related data for each quadrangle in the State, funding of two new seismic stations in the Wilmington area to monitor earthquakes, and expansion of the cartographic information program. During FY 1984, the DGS drilled 52 test holes, which provided 1,100 feet of penetration for new geologic information.

REVIEW BY NONFUEL MINERAL COMMODITIES

NONMETALS

Greensand.—In May, Contractors Sand & Gravel Co. Inc. began producing greensand from the floor of its Mount Pleasant sand and gravel pit 4 miles north of the Middletown-Odessa area. Through December, Zook & Ranck Inc. trucked 1,424 short tons of the glauconite sand at $13.00 per ton f.o.b. to its processing facility in Gap, PA, about 50 miles north of the Delaware pit. Processing included drying and screening. The slow release potash fertilizer and soil conditioner is sold in 5-, 40-, and 50-pound packages for organic gardening and home use and marketed throughout the United States, including Hawaii and Alaska, under the trade name "Jersey Greensand." About 10% of the product is sold in bulk to the local farming communities, which prefer natural-organic fertilizers. Prior to Delaware's entry into greensand production, Inversand Co. in Clayton, NJ, had been the sole, recent domestic producer.

Gypsum (Calcined).—Georgia-Pacific Corp.'s (G-P) Gypsum Div. at Wilmington calcined imported Nova Scotian crude gypsum and manufactured wallboard and "gypcrete," a floor underlayment material. The plant, which operated 168 hours weekly throughout 1983, continued at full capacity throughout 1984 to meet the increased demand in residential and commercial building construction. Value of production increased 15% with a 7% increase in output

over that of 1983. The corporation operated seven wallboard plants east of the Rocky Mountains and accounted for 13% of the total domestic production.

The Gypsum Div. of G-P developed and had a patent pending on a new gypsum wallboard product designed for use in the fast-growing exterior insulation systems industry. The product, Dens-GlassTM, was scheduled for release in 1985. It will be used for exterior sheathing and application where moisture is a potential problem.

Magnesium Compounds.—Barcroft Co. produced a variety of pharmaceutical-grade magnesium compounds and aluminum hydroxide from Delaware Bay seawater at its specialized fine chemical manufacturing facility in Lewes, near Cape Henlopen at the entrance to Delaware Bay. In magnesium oxide equivalent, the value of production increased 18% while output increased 13% over that of 1983.

Manganese Compounds.—American Minerals Inc. processed imported manganese ores at its grinding plant near the Wilmington Marine Terminal. The plant shipped most of its manganese products to the face brick industry for coloring purposes; the balance was sold for animal feeds and fertilizers. Also, imported chrome ore and various grades of magnesium oxides were ground for use in refractory bricks. The company, with headquarters in Norristown, PA, operated other grinding facilities in Camden, NJ, Rosiclare, IL, and El Paso, TX.

Sand and Gravel.—Construction sand and gravel production is surveyed by the U.S. Bureau of Mines for even-numbered years only; the 1983 chapter gave estimates. Data for odd-numbered years are based on annual company estimates made before yearend.

Reported sales in 1984 totaled 1 million short tons valued at $2.8 million, f.o.b. plant or mine; accordingly, production and value decreased 28% and 13%, respectively, below that of 1983. Delaware along with Alaska and Hawaii were the only States in which production fell below that of 1982. In 1984, production was reported from nine operations, which included two with stationary plants, four with portable plants, two pit-run operations, and one dredging operation.

Table 3.—Delaware: Construction sand and gravel sold or used in 1984, by major use category

Use	Quantity (thousand short tons)	Value (thousands)	Value per ton
Concrete aggregate	W	W	$5.83
Plaster and gunite sands	W	W	5.27
Road base and coverings	W	W	2.54
Fill	W	W	2.04
Other	1,003	$2,795	2.79
Total or average	1,003	2,795	2.79

W Withheld to avoid disclosing company proprietary data; included with "Other."

Slag—Steel.—International Mill Service Co. processed and sold, mainly as road base material, the steel slag generated by the two electric arc furnaces at the plate mill of Phoenix Steel Corp. in Claymont. Production and sales increased 7.5% over that of 1983.

Sulfur (Recovered).—Elemental sulfur was recovered as a nondiscretionary by-product of petroleum refining at the Texaco Refining & Marketing Co. in Delaware City. Production and value increased about 4% over that of 1983. The refinery, which is specifically designed to refine the less-expensive, very high-sulfur crude oil imported from Venezuela and Mexico, also produced sulfuric acid and petroleum coke. Texaco acquired the former Getty Oil Co. refinery in July 1984 when the Federal Trade Commission approved the Texaco acquisition of Getty Oil.

The production of recovered elemental sulfur at U.S. petroleum refineries increased to an all-time record high in 1984. About 82% of the sulfur consumed in the United States was converted to sulfuric acid prior to end use.

Titanium Dioxide.—E. I. du Pont de Nemours & Co. Inc. continued to operate one of its four domestic titanium dioxide (TiO_2) pigment plants in Edgemoor. The plant used the chloride process and utilized ilmenite rather than the higher cost rutile as the feedstock. It had an annual pigment capacity of 100,000 metric tons. The ilmen-

ite was shipped from the Du Pont operations at Starke, FL, and Eneabba, Western Australia.

Production and consumption of TiO_2 pigments rose to a new peak for the second consecutive year, because of continued economic expansion and increased demand from the homebuilding industry. These white pigments were used primarily in the manufacture of paints, paper, and plastics. Notable were the increased consumption for paints and plastics, and the sharp decrease in consumption in paper.

METALS

Phoenix Steel, which entered bankruptcy in 1983, continued to operate its Claymont plate mill and its pipe and tube mill in Phoenixville, PA, while searching for new financing. In 1984, while operating under court protection from its creditors under chapter 11 of the Federal Bankruptcy Act, the company was able to trim its loss from that of 1983 by about $6 million compared with an $18.6 million loss for 1983. The company, which has $143 million in liabilities and only $117 million in assets, has not posted a profit since 1981 and has accumulated operating losses since then of more than $85 million.

In October, Phoenix Steel approved, in principle, a plan that would have two private investors purchase the company. Under the plan, the steel producer would emerge in 1985 as a private company owned by the partnership with the current management and labor force remaining in place at the two plants. Final approval of the plan by a committee representing creditors' interests and by the U.S. Bankruptcy Court was unlikely before mid-1985.

Reclaimed Metals and Materials.—The Delaware Reclamation Project, which was managed by the Delaware Solid Waste Authority, went into commercial operation in March. The facility, just north of the Delaware Memorial Bridge at Pigeon Point, produced 6,700 short tons of ferrous metal, 1,300 short tons of glass, and 750 short tons of aluminum in 1984 from mixed municipal solid waste generated in New Castle County.

The exemption of aluminum beverage cans from Delaware's mandatory container deposit law continued to confirm the unmatched recyclability of aluminum. In 1984, Delaware consumers recycled more than 4.8 million pounds of used aluminum beverage cans. This represented about 126 million cans or approximately 60% of all aluminum beverage cans shipped statewide. Delaware, nicknamed "the First State," was also the first State to have excluded aluminum cans from its deposit law, when in January 1983, it implemented container deposit legislation. Unless extended, the exemption was scheduled to expire January 1, 1986. During the year, the Delaware Solid Waste Authority recovered another 28.5 million cans bringing the statewide total to about 155 million cans, or 73% of statewide shipments. Prior to the exemption, the State's aluminum recyling rate was estimated at 10% to 20%.

---

[1]State Mineral Officer, Bureau of Mines, Pittsburgh, PA.

Table 4.—Principal producers

Commodity and company	Address	Type of activity	County
Greensand:			
Contractors Sand & Gravel Co. Inc	Box 2630 Wilmington, DE 19805	Pit	New Castle.
Gypsum (calcined):			
Georgia-Pacific Corp., Gypsum Div	Wilmington Marine Terminal Box 310 Wilmington, DE 19899	Plant	Do.
Magnesium compounds:			
American Minerals Inc	One Montgomery Plaza Suite 906 Norristown, PA 19401	Plant (grinding)	Do.
Barcroft Co	40 Cape Henlopen Dr. Lewes, DE 19958	Plant (pharmaceutical-fine chemical).	Sussex.
Sand and gravel (construction):			
Contractors Sand & Gravel Co. Inc	Box 2630 Wilmington, DE 19805	Pit	New Castle.
Dover Equipment & Machine Co	113 West 6th St. New Castle, DE 19720	Dredge	Kent.
Parkway Gravel Inc	4048 New Castle Ave. New Castle, DE 19720	Pits	New Castle.
Slag, steel:			
International Mill Service Inc	Philadelphia Pike Box 160 Claymont, DE 19703	Plant (processing).	Do.
Steel:			
Phoenix Steel Corp	4001 Philadelphia Pike Claymont, DE 19703	Mill (plate)	Do.
Sulfur (recovered):			
Texaco Refining & Marketing Co.[1]	Wrangle Hill Rd. Delaware City, DE 19706	Refinery (petroleum).	Do.
Titanium dioxide:			
E. I. du Pont de Nemours & Co. Inc.[2]	1007 Market St. Wilmington, DE 19898	Corporate headquarters.	Do.
Do	Edgemoor, DE 19809	Plant (chemical).	Do.

[1]Also sulfuric acid and petroleum coke. Texaco acquired Getty Oil Co. in July 1984.
[2]Also zircon and foundry mixes.

☆U.S. GOVERNMENT PRINTING OFFICE: 1986-491-457:20106